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(54) Detergent composition.

(57) A detergent composition, suitably in bar or stick form, comprises synthetic surfactant and carrier system including polyalkylene glycol monoester. The polyalkylene glycol monoester suitably comprises one or more polyethylene glycol monoalkylesters and suitably has a mean molecular weight between 200 and 8000, more suitably between 1000 and 6000. The composition is appropriate for use as pretreatment stick and can be applied to dry or wet laundry fabrics.

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Description

Detergent Composition

The present invention relates to a detergent composition for use as a pretreatment product. In particular the present invention relates to a product suitable for application to spots and stains on soiled textiles prior to normal laundering of the textiles.

Such products are known. US 4295845, US 4363756 and US 4457857 for example each relate to a product incorporating a particular detergent system.

It is an object of the present invention to provide a detergent pretreatment product which is effective against a range of stain types.

It is a further object of the present invention to provide a detergent pretreatment product which is applicable to wet or dry textiles.

It is a further object of the present invention to provide a detergent pretreatment product which is readily transferable to the fabric being treated and which is removable from the fabric during normal laundering over a wide range of temperatures, for instance 15 to 90°C.

It is a further object of the present invention to provide a detergent pretreatment product which is storage stable at temperatures up to 40°C.

It is a further object of the present invention to provide a detergent pretreatment product in solid, especially although not exclusively, in stick or bar form.

According to the present invention there is provided a detergent composition comprising synthetic detergent and carrier system including polyalkylene glycol monoester.

An essential ingredient of the present detergent compositions is a synthetic surfactant which may be selected from the group of anionic, nonionic, cationic and zwitterionic surfactants.

The synthetic surfactants are a well-known class of compounds and are extensively described in the art, such as e.g. in Schwartz, Perry, Vol. II, 1958, "Detergents and Surface-active Agents".

In particular, nonionic surfactants have been found suitable for inclusion in the present compositions. They may be employed either alone or in combination with other types of surfactants. Preferably, nonionic surfactants are employed, selected from the classes of alkylene oxide condensation products with fatty alcohols, alkylphenols, fatty acids and fatty acid amides. Particularly preferred are the nonionic surfactants selected from the class of fatty alcohol ethoxylates having HLB values within the range of 9 to 13, in particular 9 to 11, such as e.g. a C₁₂-C₁₅ alcohol condensed with 4 moles of ethylene oxide per mole of alcohol.

Anionic surfactants suitable for inclusion in the present compositions are preferably those having a large degree of nonionic character, such as the anionic derivatives of alkoxyated nonionic surfactants. Suitable examples are the alkylpolyglycoethersulphonates and -carboxylates.

If a higher foam profile is desired than can be achieved with nonionic surfactants, it may be of advantage to include a nonionic-anionic surfactant combination comprising in addition to a nonionic surfactant up to 50% of a high-foaming anionic surfactant such as e.g. a sodium alkyl benzene sulphonate.

The actual amount of the synthetic surfactant is not very critical. It can be included in amounts of up to 50% by weight of the total composition. Preferably, it is included in an amount of 10 to 40% by weight.

The present carrier system includes polyalkylene glycol monoester, which is preferably present in an amount between 1 and 50wt%, more preferably 5 and 40wt%, even more preferably in an amount between 12 and 35 wt %, with respect to the total composition. Preferably the polyalkylene glycol is polypropylene glycol or polyethylene glycol, more preferably polyethylene glycol. The preferred monoesters are mono alkyl esters in which the alkyl ester is derived from one or more fatty acids having a carbon content within the range of from C₁₂ to C₂₂. Preferably saturated fatty acids are employed. Preferred examples are lauric, palmitic and stearic acids. Suitably the ester employed has a HLB value between 1.5 and 20.0, more suitably between 13.0 and 19.5. Preferably, the ester employed is polyethylene glycol mono alkyl ester having a molecular weight between 200 and 8000, more preferably between 400 and 6000, even more preferably between 1000 and 6000. More than one polyalkylene glycol monoester can be employed. The one or mixture of polyalkylene glycol monoesters employed is selected according to gross physical properties desired in the final product. Suitably the polyalkylene glycol monoester(s) is selected according to its melting point, which can determine the storage stability and physical strength of the product in solid form, and its water solubility properties, which can effect its ease of removal from the fabric being treated during any subsequent laundering operation, especially at low temperatures.

If desired, the carrier system can include one or more materials compatible with polyalkylene glycol monoesters, such as polyalkylene glycol diesters. In any such admixture however the polyalkylene glycol monoester should be present in the major amount viz. more than 50wt%.

Preferably the carrier system includes a particulate material. Suitably the particulate material is an insoluble inorganic material and is selected from the group comprising clays, talcs, calcite and mixtures thereof. For example it can be a kandite material such as kaolin clay. The amount of particulate material is suitably present in an amount between 1 and 50wt%, more suitably between 10 and 30wt%, even more suitably between 15 and 25wt% with respect to the total composition. The actual amount employed in any one case will depend on the nature and amount of the other ingredients present and on the final product form desired. In the case of an end product in the form of stick or bar it is probably essential that some particulate material is present.

Preferably not so much should however be employed that viscosity problems during preparation of the product are encountered. As a general guide however a carrier system incorporating a particulate material suitably comprises between 40 and 75wt% of the total composition.

The present compositions may optionally contain bleaching agent, which may be selected from the group of the reducing bleaches and the peroxygen bleaches, the latter type of bleaches being preferred.

The peroxygen bleaching agents are selected from the group of organic peroxy-acids and their salts, the inorganic peroxy-acids and their salts, and mixtures of peroxy-acid precursors and inorganic peroxy-salts which yield organic peroxy-acids in aqueous environment.

Suitable examples of organic peroxy-acids range from the lower peroxy carboxylic acids such as peracetic acid to the higher peroxy carboxylic acids, in particular the di-peroxygen carboxylic acids, such as di-peroxygen dodecanoic acid.

Suitable examples of the inorganic peroxy-acids are the group VA and VIA peroxides, such as peroxy-monophosphoric acid, peroxy-diphosphoric acid, peroxy-monosulphuric acid and peroxy-disulphuric acid. Also the alkali metal and ammonium salts thereof are suitable. Preferred is peroxy-monosulphate, commercially available in the form of the triple salt $\text{KHSO}_5 \cdot \text{KHSO}_4 \cdot \text{K}_2\text{SO}_4$ in the molar ratio of about 2:1:1.

The group of bleaching agents preferred for inclusion in the present compositions are the mixtures of peroxy-acid precursors and inorganic peroxy-salts delivering a bleaching action at low temperatures. Peroxy-acid precursors are well known in the art and are described e.g. in British Patents 836,988, 855,735 and 970,356, in United States Patents 1,246,339, 3,332,882 and 4,128,494, in Canadian Patent 844,481 and in a series of articles by A.H. Gilbert in Detergent Age, June 1967, pages 18-20, July 1967, pages 30-33 and August 1967, pages 26, 27 and 67. Preferred peroxy-acid precursors are tetraacetylene diamine (TAED), tetraacetylglucuril (TAGU), glucose pentaacetate (GPA), xylose tetraacetate (XTA), and the group of acyloxy benzene sulphonates.

Inorganic peroxy-salts suitable for use in combination with a precursor are also well known and include the alkali metal perborates (mono- or tetrahydrate), percarbonates and persulfates. The preferred member of this group is sodium perborate.

The ratio by weight of the inorganic peroxy-salt to the peroxy-acid precursor should lie within the range of from 8:1 to 1:1, and preferably lies within the range of from 4:1 to 1.5:1.

The amount of bleaching agent is conveniently expressed in terms of the amount of available oxygen, i.e. the amount of oxygen which can theoretically be delivered at application. The bleaching agent is included in the present compositions in an amount corresponding to from 0.5 to 50% by weight of available oxygen. Preferably, the amount of available oxygen lies within the range of from 1.5 to 3% by weight.

When considering reducing bleaches it will be understood that the amounts should be included which deliver bleaching action which is equivalent to the above ranges for available oxygen.

The detergent pretreatment compositions may further contain conventional minor ingredients, such as lipolytic, proteolytic and amylolytic enzymes, monocarboxylic acid salts, bleach stabilisers such as e.g. the phosphonate bleach stabilisers, optical brightening agents, perfumes, dyes, whiteners, moisture-adsorbents such as anhydrous salts, and the like.

The detergent pretreatment compositions may be prepared by any convenient method for example by extruding or by casting. In a preferred method first the polyalkylene glycol monoester and the synthetic surfactant are mixed and heated up to between about 60 and 70°C. Subsequently, the peroxygen bleach, optionally followed by the precursor, is added while continuously stirring until a homogeneous mix is obtained. After preparation, the compositions are cast and solidified to the desired shape by cooling to ambient temperature.

The detergent pretreatment compositions may be cast and solidified to any desired shape, but preferably are shaped to sticks suitable for application in screw-up or push-up stick holders, thereby providing the customer with a very convenient product form. To this purpose, the composition in still liquid form can simply be cast in the stick holder without the need of any lubricant. Alternatively the product can be in the form of a stick with a wrap-around covering.

In use, the present composition can be applied to stains and spots on either dry fabric or fabric that has been dampened with water. Following either mode of application the fabric is then subjected to a normal laundering process. Direct application to a dry fabric is usually more convenient for the user. When applied to a dry fabric, the composition acts on the spot or stain during an early part of the normal laundering process and is removed during a later part of the laundering process. When applied to a fabric already dampened with water best results are obtained if some time, for example about 5 minutes, is allowed to elapse in order to give the composition time to act on the spot or stain prior to the normal laundering process.

Embodiments of the present invention will now be described by way of example only with reference to the following Examples:

Examples 1 to 4

Detergent pretreatment sticks were made according to the formulations contained in Table I, in which the stick ingredients are given in weight percentage amounts with respect to the final stick composition.

Table I

Example	1	2	3	4
PEG 6000 monolaurate	5.0	10.0	15.0	20.0
PEG 400 monolaurate	25.0	20.0	15.0	10.0
nonionic C ₁₃₋₁₅ 4EO	30.0	30.0	30.0	30.0
sodium perborate monohydrate	12.0	12.0	12.0	12.0
tetraacetythylenediamine	4.0	4.0	4.0	4.0
kaolin clay	22.6	22.6	22.6	22.6
calcium dequest	1.4	1.4	1.4	1.4

Each stick contained different amounts of each of PEG 6000 monolaurate (i.e. polyethyleneglycol monolaurate having an average approximate molecular weight of 6000) which had an HLB of 19.3 and PEG 400 monolaurate (i.e. polyethyleneglycol monolaurate having an average approximate molecular weight of 400) which had an HLB of 13.0. The remaining ingredients were the same in each stick. "Nonionic C₁₃₋₁₅ 4EO" means a fatty alcohol ethoxylate derived from a C₁₃₋₁₅ alcohol condensed with 4 moles of ethylene oxide per mole of alcohol. The calcium dequest contained 35wt% active material.

In each case the stick was prepared by admixing the PEG monolaurates and the nonionic surfactant at 70°C at which temperature the mixture is fully molten. The mixture is then cooled somewhat and the remaining ingredients stirred in. The still liquid mixture is poured directly into stick holders and allowed to set.

Examples 5 to 7

Detergent pretreatment sticks were made according to the formulations contained in Table II, in which the stick ingredients are given in parts by weight with respect to the final stick compositions.

Table II

Example	5	6	7
PEG 4000 monolaurate	10.0	20.0	30.0
nonionic C ₁₃₋₁₅ 4EO	30.0	30.0	30.0
sodium perborate monohydrate	12.0	12.0	12.0
tetraacetythylenediamine	4.0	4.0	4.0
kaolin clay	22.6	22.6	22.6
calcium dequest	1.4	1.4	1.4

PEG 4000 monolaurate stands for polyethylene glycol monolaurate having an average approximate molecular weight of 4000 and had an HLB of 19.0 and nonionic C₁₃₋₁₅ 4EO has the meaning given above. The calcium dequest contained 35wt% active material. Sticks of examples 5, 6 and 7 were prepared by the procedure outlined for Examples 1 to 4.

Examples 8 and 9

Detergent pretreatment sticks were made according to the formulations contained in Table III, in which the stick ingredients are given in weight percentage amounts with respect to the final stick composition.

Table III

Example	8	9	5

PEG 6000 monolaurate	15.00	15.0	10
PEG 400 monolaurate	20.0	15.0	
nonionic C ₁₃₋₁₅ 4EO	30.0	30.0	
sodium perborate monohydrate	12.0	12.0	15
tetraacetylenediamine	4.0	4.0	
kaolin clay	17.6	-	
talc	-	22.6	20
calcium dequest	1.4	1.4	

PEG 6000 monolaurate, PEG 400 monolaurate and nonionic C₁₃₋₁₅ 4EO have the meanings given under Examples 1 to 4. The calcium dequest contained 35wt% active material. Each stick was prepared according to the procedure given for Examples 1 to 4.

Each of the products of Examples 1 to 9 on cooling set to a firm consistency and was storage stable at temperatures up to 40°C. In use the stick could be moved out of its holder, either by a screw-type action or by merely pushing, and retained its shape in use.

In use the exposed part of the stick was rubbed onto the spotted or stained portion of the fabric in a dry state. In each case the composition transferred readily to the fabric. Each test fabric was subjected to a normal laundering process in an automatic washing machine at a range of temperatures. In each case the composition was removed from the fabric during the laundering operation and the stained area of the fabric was satisfactorily washed.

Claims

1. A detergent composition comprising synthetic surfactant and carrier system including polyalkylene glycol monoester.
2. A composition according to claim 1 comprising between 1 and 50wt% synthetic detergent.
3. A composition according to claim 2 comprising 10 to 40wt% nonionic surfactant.
4. A composition according to any one of the preceding claims wherein the polyalkylene glycol monoester comprises one or more polyethylene glycol monoalkylesters wherein the alkyl ester is derived from one or more fatty acids having a carbon content within the range of from C₁₂ to C₂₂.
5. A composition according to claim 4 wherein the polyethylene glycol monoalkylester has a mean molecular weight between 200 and 8000.
6. A composition according to claim 5 wherein the polyethylene glycol monoalkylester has a mean molecular weight between 1000 and 6000.
7. A composition according to any one of the preceding claims wherein the polyalkylene glycol ester is present in an amount between 1 and 50wt% with respect to the total composition.
8. A composition according to claim 7, wherein the polyalkylene glycol ester is present in an amount between 12 and 35 wt % with respect to the total composition.
9. A composition according to any one of the preceding claims wherein the carrier system includes a particulate material.
10. A composition according to claim 9 wherein the particulate material is present in an amount between 1 and 50wt% with respect to the total composition.
11. A composition according to claim 9 or claim 10 wherein the particulate material is selected from the group comprising clays, talcs, calcite and mixtures thereof.
12. A composition according to any one of the preceding claims including bleaching agent.
13. A composition according to claim 12 comprising an amount in total of one or more bleaching agents corresponding to from 0.5 to 5.0% by weight of available oxygen.
14. A composition according to claim 12 or claim 13 wherein the bleaching agents present includ

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tetraacetylene diamine and sodium perborate.

15. A composition according to any one of the preceding claims in solid form.

16. A composition according to claim 15 in the form of a bar or stick.

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A3 pretreatment stick and can be applied to dry or wet laundry fabrics.

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EUROPEAN SEARCH REPORT

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EP 87 30 9569

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	FR-A-1 172 959 (CALIFORNIA RESEARCH CORP.) * Abstract * ---	1,2,4-8	C 11 D 17/00 C 11 D 3/37 C 11 D 3/20
X	US-A- 65 030 (PROCTER & GAMBLE) * Page 6, lines 5-29; claims 1-7 * ---	1,2,4-8 ,12-14	
X	EP-A-0 024 031 (STERLING DRUGS) * Page 2, lines 2-10; claims 1-8 * ---	1,2,4-8	
Y	DE-B-1 062 867 (E. WEIH) * The whole document * ---	1	
Y	US-A-4 285 845 (R.R. SEPULVEDA et al.) * Whole document * ---	1	
Y	US-A-3 923 701 (K.G. RUTHERFORD et al.) * Whole document * ---	1	
A	US-A-4 145 183 (J.H. BOSTWICK) * Example 1; claims * -----	16	TECHNICAL FIELDS SEARCHED (Int. Cl. 4) C 11 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29-01-1990	Examiner GOLLER P.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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